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ABSTRACT

A study examined whether students who underwent training and gained experience in the use of computer word processing techniques would score significantly higher on a writing test than students who received no such training. Students in two randomly selected English Composition II classes at Gloucester County College (New Jersey) were randomly labeled as either the experimental group or as the control group. Students in the experimental group spent one class period per week for 12 weeks in the computer lab receiving instruction and gaining experience in using computer word processing. Students in the control group received no such instruction. Students in both groups were given identical writing assignments. Comparison of holistically-scored pre- and posttests indicated that a significant difference existed between the posttest mean scores of the two groups, with the experimental group scoring higher than the control group. (Two tables of data are included.) (RS)

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AN INVESTIGATION INTO THE EFFECTS OF COMPUTER WORD PROCESSING UTILIZATION ON THE WRITING SKILLS OF STUDENTS AT GLOUCESTER COUNTY COLLEGE

Emergence of Higher Education in America Seminar

by

Robert L. Hart, Ed.M.

Gloucester County College

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A Practicum Report Presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education

Nova University

February, 1992

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Abstract of a Practicum Report Presented to Nova University in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

AN INVESTIGATION INTO THE EFFECTS OF COMPUTER WORD PROCESSING UTILIZATION ON THE WRITING SKILLS OF STUDENTS AT GLOUCESTER COUNTY COLLEGE

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Robert L. Hart

February, 1992

The primary purpose of this study was to determine if there was a positive relationship between the utilization of computer word processing techniques and the improvement of writing skills of college freshmen during the time frame of a single semester. The problem which prompted this study was the general lack of writing skills exhibited by many of today's college students. The harnessing of the personal computer with its word processing capabilities has been seen by some researchers as a potential solution to the problem. The research question herein posed, then, concerned whether students who underwent training and gained experience in the use of computer word processing techniques would score significantly higher on a posttest than those students who had not received such training and experience.

After an extensive literature review was conducted to provide a framework for the study, two English Composition II classes were randomly selected to participate in the

study. One was randomly labeled the Experimental Group and the other the Control Group.

Students in both groups were pretested during the second class meeting of the semester and posttested at the end of twelve weeks. During the interim, the Experimental Group received experimental treatment while the Control Group did not.

At this point, pretest and posttest essays were holistically scored, using Educational Testing Service guidelines. Pretest means and standard deviations were then calculated and statistically analyzed. No significant difference could be found. However, when posttest means and standard deviations were subjected to identical statistical analysis by means of a one-tailed t-test with a confidence level of .05, the resulting t was 3.572. Since this calculated value of t was greater than the critical value (1.721), it was possible to reject the null hypothesis.

The principal conclusion drawn from the results was that a significant difference existed between the posttest mean scores of the two groups, therefore granting validity to the research hypothesis. The significance of the difference was established by means of the t-test.

Recommendations included disseminating the findings of the study to interested faculty and encouraging replication of the study. A final recommendation called for the creation of a separate computer writing classroom at the college.

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Chapter 1

INTRODUCTION

Background and Significance

For more than forty years, college English instructors have been faced with the problem of lack of general competence in written communication on the part of many college freshmen. Exacerbating the problem is the fact that all professions today, and nearly all vocations, require a mastery of communication skills, including writing. An ability to write effective reports, letters and memoranda is crucial to advancement in most careers in the 1990s.

Gloucester County College's problem in this regard is not unlike that of numerous other two-year institutions of higher education. In recent years, however, an important technological tool, the personal computer with its word processing capabilities, has come into being. And even though the use of computer word processing in the teaching of English composition is a relatively new practice, it has gained such wide acceptance that virtually every college and university in the United States has at least one computer writing laboratory to which students may go to complete writing assignments for one class or another. In many cases, English composition classes are conducted in the computer writing lab, thus allowing students to gain familiarity

with a particular word processing program and to utilize that program in planning, drafting, revising, editing and rewriting various in-class essays as a substantial part of their coursework. Numerous studies have attested to the usefulness of the computer in this regard, as will be seen in the literature review section of this paper.

In the last five years, the Computer Writing Laboratory at Gloucester County College has been utilized by increasing numbers of students who wish to draft, revise, edit and print writing assignments for various classes. The lab has grown in size (square footage), in numbers of computers and printers, and in the quality of computer hardware and software. However, while it is true that most English Department faculty members encourage their students to make use of the lab, and some even hold classes in the Computer Writing Lab on a regular basis, no one in the department has heretofore conducted research into the relationship existing between the use of computer word processing equipment in the lab (or classroom) and the improvement of writing skills of students involved.

One purpose of this practicum, therefore, was to determine if there is, indeed, a positive relationship between the regular use of computer word processing techniques and improved writing skills of college freshmen. An extended literature review was conducted to reveal similar research studies and to discover opinions and conclusions made by scholars in the areas of computer use

and the teaching of writing. In this study, a quasi-experimental research design was deemed appropriate and was, therefore, employed. Two English Composition II classes were randomly selected to participate, one being labeled the Experimental Group and the other the Control Group. Both groups were pretested, and no significant difference could be found in their mean scores. The Experimental Group underwent the treatment, and a posttest was administered to both groups. The data gathered were statistically analyzed by means of a one-tailed t-test with an alpha level of .05, in order to determine if a significant difference existed between mean scores. This time a significant difference was noted.

A second purpose of the study was, of course, to disseminate the findings to all Gloucester County College faculty members and administrators, particularly those who have expressed an interest in the development of a program linking computer word processing and the teaching of writing. Interested parties include the coordinator of the English Department, the director of Developmental Studies, the chairman of the Liberal Arts Division and the Vice President of Faculty at Gloucester County College. Because the study had the support of administrative personnel and because it appeared to be of direct benefit to the students of the college, it was viewed as appropriate and feasible.

This practicum was related to topics examined in the Emergence of Higher Education in America Specialization

Seminar, particularly those concerned with recent technological advances and their use in the classroom. Other topics, including the special communication needs of college students in this Information Age, were also justification for this practicum. And since the purpose of this study was so closely related to the aforementioned topics, it is an appropriate practicum.

Research Question

The central research question was as follows: "Did Gloucester County College students who received classroom training and experience in the use of computer word processing techniques score significantly higher on the posttest than those students who had not received such training and experience?"

Research Hypothesis

Gloucester County College students who undergo training and gain experience in the use of computer word processing techniques will score significantly higher on a posttest than will those students who do not receive such training and experience.

Null Hypothesis

Gloucester County College students who undergo training and gain experience in the use of computer word processing techniques will not score significantly higher on a posttest than will those students who do not receive such training and experience.

Chapter 2

REVIEW OF THE LITERATURE

An extensive literature review was conducted to reveal research projects linking computer word processing with writing instruction, as well as to discover opinions and conclusions drawn by acknowledged authorities in the field of computer word processor usage and the teaching of writing. Numerous studies in both categories were discovered, including works by Vockell and Schwartz (1988), Etchison (1989), Weiss (1989), Haas (1989), McAllister and Louth (1988), Bernhardt and Others (1989), Gaunder (1988), Herrmann (1989), Strickland (1989), Klem and Moran (1991), and Hawisher and Selfe (1991).

One study, completed by Vockell and Schwartz at Purdue University Calumet (1988:148), involved the random selection of one class of freshman composition students as the experimental group and another as the control group to test the hypothesis that "students using word processors would be able to use their class time more effectively than the students in a control group without computers and would therefore show greater improvements in writing skills during the course." Students in the experimental group met in the microcomputer lab for all of their English composition class sessions while control group students met

in a classroom without computer word processing equipment. Both classes received instruction in the so-called "writing process" method, a system developed and refined over the past fifteen or twenty years by researchers Janet Emig, James Britton and others. The authors (Vockell and Schwartz, 1988:149) state that, "The independent variable consisted of the use of a word processing program on IBM microcomputers," while the primary dependent variable was the measure of writing ability.

Throughout the semester, the two groups wrote numerous in-class essays, the control group using pen and paper, the experimental group using computers. A pretest writing sample was obtained the second day each class met, and a posttest writing sample was obtained on the final day of the semester. Students were <u>not</u> permitted to use computers during the pretest or posttest sessions. This restriction was included to make it impossible for essay evaluators to know whether an essay was written by a control group member or by an experimental group member. The scoring system was one devised by Paul B. Diedrich for the National Council of Teachers of English, rather than the holistic scoring method which is widely used by researchers working in the field of written composition.

The results proved to be conclusive: Even though the control group outscored the experimental group on the pretest, the experimental group scored significantly higher on the posttest, and the increase in scores between pretests

and posttests was significantly higher for the experimental group. Thus, the use of computer word processing did result in the improvement of writing skills; for, according to the two researchers (Vockell and Schwartz, 1988:153), the evidence drawn from the research project indicates clearly that students in the experimental group showed significant improvement in "their ability to write more coherent, unified papers." Vockell and Schwartz (1988:153) continue:

> These improvements appear to have arisen because the computer eliminated the need to focus on mechanical, technical details; because the computer facilitated the composing process itself by engaging students actively at each stage; and because the computer enabled the students to focus on more important, higher-level skills in English composition.

A second study, this one conducted at Glenville State College in West Virginia (Etchison, 1989:34), examined "the effects of word processing on writing quality and the amount of text produced by basic writers." Etchison's design was similar to that of Vockell and Schwartz (1988) in that the writing process method was utilized--with an apparent emphasis on "conferencing and multiple drafts" (Etchison, 1989:37); IBM personal computers were used; and the experimental group, of course, made use of word-processing software while control group members used only pen and paper. There were, however, significant differences between the two research studies. One difference was the use of basic writers as subjects, still a rarity at the time of Etchison's study (1989). Another was that students in the experimental group used

word-processing software in taking the posttest; (papers of students in the control group were typed on the same computers so that readers would not be able to distinguish between the efforts of the two groups). Essays were also "randomly mixed so that raters would not know whether they were reading a paper written before or after instruction, or by a student in the experimental or control section" (Etchison, 1989:38). In addition, holistic scoring was used in obtaining test results; Etchison (1989) was concerned about the number of words produced by the student writers, while Vockell and Schwartz expressed no such concern; and Etchison's study entailed the use of dual pretests and posttests, meaning that each student wrote two pretest essays (one explanatory and one persuasive) and two posttest essays of the same two varieties.

The results of this study include the following: 1) there was a significant increase in the number of words written in the pretest and posttest for both the experimental and the control group (from 390 words on the pretest to 689 words on the posttest for the control group; from 384 words on the pretest to 1304 words on the posttest for the experimental group--a truly significant increase of 920 words for the group using the word processing equipment); but 2) there was "no significant difference in growth of writing quality across the semester between students using word-processing software on computers and students using handwriting" (Etchison, 1989:39). The

importance of the first result, the positive one, should not be minimized: the author (Etchison, 1989:39) says that "the word-processing software seemed to encourage the production of text to an even greater degree among basic writers than it did among the large population of college writers [Etchison had] studied earlier." The lack of a significant increase in writing quality for experimental-group posttest essays is not of great concern for the researcher; (the experimental group's increase in mean score was just .2 higher than that of the control group). He explains (Etchison, 1989:40) that "a 15-week semester is a short period of time, especially for basic writers who are often struggling with their lack of writing experience. . . . Perhaps significant differences might turn up later [if the students were to continue to use] word-processing software in other courses." An important, but unquantified, outgrowth of the study concerned the attitudes of experimental group students toward the use of computers; the researcher (Etchison, 1989:36) discovered that "the majority of students using word-processing software were at their terminals working on their essays five to ten minutes before class was officially scheduled to begin, . . . [and the instructor] always had to force students to leave the microcomputer lab" so that the next class could come in.

In his study, Weiss (1989:45) contends that students might benefit more from word-processing software use if

the computer were not used "only as an aid to . . . late-stage revision," as is so often the case. Weiss proposes having students "use the computer throughout the composing process" (1989:45). Like other researchers of English composition, this author (Weiss, 1989:46) stresses "the writing process" and discusses computer-use in "collecting information, drafting, evaluating, and revising" written work. Although this study was not of a quasi-experimental nature, as were other cited studies, the author (Weiss, 1989) did make use of a computer-lab situation and did allow for the possibility of non-computer use at times, especially with regard to planning--a sine qua non expressed repeatedly by Haas (1989). Weiss (1989: 58) sees the role of the computer in terms of "production . . . [as well as] inner-action and interaction." Moreover, he recommends the use of computer word processors anytime students are "eager to use computers, are allowed to use computers throughout the stages of composing, and are involved in responding to assignments that demand reflection and creativity" (Weiss, 1989:58).

Haas's work (1989:181), alluded to earlier, downplays the use of the computer word processor in the overall planning phase of the composing process, but indicates that there was "significantly more local or sequential planning" when students used word processors in completing writing assignments. Haas also asserts that--despite claims of several researchers, including Daiute whose 1983 study

maintains that the use of the word processor may increase planning because there is less concern with handwriting, spelling and recopying problems--higher level planning is not as likely to occur with computer use, and "writers may actually plan less when using word processing" (Haas, 1989:184). And even though Haas's views frequently run counter to the majority opinion in most areas of computer use, she does agree with Etchison (1989) with regard to two areas (Haas, 1989:204): First, students using word processing equipment rather than pen and paper do tend to produce more text; and, second,

> the word processor is an important and valuable tool for writers . . . and with good reason: computer technology provides support for writing in any number of ways, from surface editing without recopying, to electronic networks which may allow easier and more fruitful collaboration among writers.

A 1988 study by McAllister and Louth investigated the effects of word processing on the ability of basic writers to make revisions on their in-class essays. The results seem definitive in one respect (McAllister and Louth, 1988:426): "Revising on the word processor in a writing laboratory seems to have produced a significant effect on the overall quality of revision." The authors (McAllister and Louth, 1988:426) recommend further research into "the order in which writers make changes on the computer screen, the permanence of such changes, and the role of the screen itself." But, in spite of these and several other unanswered questions, including the

importance of the role of attitude in the success of the writer, there is no serious question about the overall efficacy of the word processing instrument: it has become an integral part of writing instruction to many college English teachers.

Perhaps the most extensive study to date was one conducted by Bernhardt and others at Southern Illinois University (Carbondale) in 1988. The researchers (Bernhardt and Others, 1988:5) sought "to assess the broad, measureable effects of using computers to teach introductory college composition," by selecting twenty-four classes (twelve experimental and twelve control groups) "with the experimental computer classes meeting in the lab for half of their instructional time." In order to assess the success of the program, Bernhardt and his associates (1988:5) drew data from the following sources:

> Pre- and posttests of student writing under both impromptu and take-home conditions; pre- and posttests of writing anxiety; records on attendance, tardiness, withdrawals, and homework and essay assignment completion; end-of-term course evaluation by both teachers and students; and self-report data collected from teacher meetings and teacher logs.

Bernhardt and his group of researchers (1988) selected twelve instructors to teach the twenty-four groups. Each one of the faculty members chosen to participate in the study taught one control-group section and one experimental-group section. In each class--whether experimental or control--instructors used "a process approach, with emphasis

on revision through peer critiques and teacher commentary at various stages of writing" (Bernhardt and Others, 1988:7).

Evaluative measures employed by the researchers included, as stated previously, the administration of impromptu and revised writing assignments at two points in the semester. This testing protocol appears to be unique among research studies and also seems to be most effective in testing students' skills in revising essays after completion of a rough draft written in class under pressure of time. (Students wrote the impromptu essays in a 45-minute period the first time class met during the second week; received the ungraded, but later holistically scored, essays during the second class meeting of that week; and then were required to submit the final, revised version of the essay the first time the class met the next week. The same procedure was followed during the fourteenth week of class.) This method of assessment allowed scorers to examine both rough and final drafts of each essay.

It should be noted that--at the end of the semester--all essays were numerically coded and then typed so that there was no difference in the quality of the hard copy in terms of physical appearance. (However, all errors were left intact.) With this system in place, scorers would not know whether they were grading a pretest impromptu, a pretest revised essay, a posttest impromptu, or a posttest revised essay.

One finding of the study (Bernhardt and Others, 1988: 15) was that the "computer revisers . . . significantly improved (at the .05 level of confidence) the overall holistic quality." Another finding concerned the closeness that developed between computer student and instructor. Bernhardt and his associates (1988:23) believe that this came about because of "the more intimate classroom interaction, with students and instructors working together more directly, allowing them to know and understand one another."

The researchers see some irony in the fact that--while students "overwhelmingly . . . thought computers were a good writing tool [and] 78% agreed that they felt comfortable working with the word processor" (Bernhardt and Others, 1988:18)--a greater percentage of experimental group students withdrew from the class; attendance and tardiness were "worse in computer sections; . . . [and] the percentage of computer students not completing major writing assignments was double that of the regular students" (Bernhardt and Others, 1988:16). In addition, "regular students . . . completed more of their homework assignments than did the computer students" (Bernhardt and Others, 1988:16).

Overall, the researchers (Bernhardt and Others, 1988: 27) contend that "this study provides important support for using computers to teach college composition, and future studies should incorporate several features of this study."

They also caution against "simply put[ting] computers in a room and expect[ing] to see dramatic improvement in student writing and revising. Teachers, not machines, have the strongest effects on student writing improvement" (Bernhardt and Others, 1988:23). Finally, Bernhardt and the others responsible for this study indicate that the "real results of introducing student writers to computers may be realized [only] over the long term," and that a study of student writers using computers "over the space of a [single] term . . . is equivocal at best" (1988:28).

In contrast to the preceding research study (Bernhardt and Others, 1988), Gaunder (1988) found neither writing apprehension nor computer apprehension among her subjects. Using a rather small sample, she compared the revision techniques of two groups of students: "re-entering students" and "traditional-age students" (Gaunder, 1988:3). The first group was composed of two women who were returning to college after a lengthy hiatus; the second group consisted of two young women and one young man, all recent high school graduates. Both groups expressed positive views regarding the efficiency of the computer as compared to pen and paper. However, states Gaunder (1988:1), "the re-entering students revised more than the traditional age students, especially making more multi-sentence revisions." The re-entry women "also had excellent time management skills" (Gaunder, 1988:10). An important element of the study was the utilization of portfolio

grading, with "two trained holistic scorers" (Gaunder, 1988:9). As mentioned previously, the utilization of holistic scoring techniques is common practice among evaluators of student essays; however, this study's use of portfolio grading, though not unique, is a relative rarity.

Writing in 1989, Herrmann focuses on the need for better instruction in the techniques of computer word processing--along with the instruction in writing. She (Herrmann, 1989:9,10) states, however, that, "although I teach students the fundamentals of the hardware and software at the beginning of the semester and continue to provide technological instruction throughout, I want the emphasis in my courses to be on writing." Because of this primary concern with writing, Herrmann builds a strong case for employment of the team-teaching format in the computer/writing classroom. In this way, says Herrmann (1989:11), "a writing teacher could teach the writing component" while a computer word processing expert could handle continuing instruction in the technical elements. Too frequently, maintains Herrmann, students are not given adequate technical instruction initially--or are left more or less on their own, once the basics of word processing are taught to them.

Herrmann (1989:11) also advocates giving students "additional credit" for demonstration of word processing capabilities. Like Gaunder (1989), Herrmann (1989:12)

"prefer[s] the end-of-the-semester portfolio." Portfolios allow student writers to improve gradually in writing skills during the semester, while they receive feedback from teachers and peers alike. The end-of-semester portfolio, then, according to Herrmann (1989:12) "gives students the entire semester to acquire competence with the technology and to make progress in their writing before being graded."

Also writing in 1989, Strickland observes that the rooms housing the computer equipment used in the teaching of writing have produced a change in the way that writing is taught. The most noticeable change is the one from possible (if not probable) passivity on the part of the student to one of enforced activity. The students and their computers become the actors, according to Strickland, and the teacher's activities and even his or her presence become muted. The author (Strickland, 1989:12) contends that "the computer classroom is not a passive room, one where information goes out from the teacher to passive receptors." Indeed, Strickland (1989:13) contends that:

> Computers in the classroom change the location of authority, directing focus away from the teacher and the chalkboard and onto the screen, onto the text generated on the computer. In this setting, the teacher acts as facilitator, helping the information flow. Finally, computers in the classroom change the way we teach, encouraging veteran teachers to reconsider old ways of teaching composition while they cope with the new technology.

Klem and Moran (1991) also are concerned with the necessity of changing instructional strategies as writing

teachers. In addition, they realize that the situation in most computer labs is hardly utopian, as far as adequate numbers of computers and printers are concerned. But they maintain, without equivocation, that "the computer as a writing tool is here to stay. Writers who have composed on computers seldom turn back" (Klem and Moran: 1991:133). And, without question, say the two researchers, "the computer holds the promise--as elusive as this promise may now seem--of benefits to writers who have been marginalized. To these writers, who have perhaps failed in traditional classrooms, the computer presents a chance for a new beginning" (Klem and Moran, 1991:133-4).

A final study--written by two acknowledged leaders in the computer word processing/writing instruction milieu, co-editors of Computers and Composition, a journal focusing on issues surrounding the blending of computers and the teaching of writing--is one which poses a considerable number of questions about this new technology. The authors (Hawisher and Selfe, 1991:55) see extensive use of computer word processors in the writing classroom--and that is commendable--but "all too frequently . . . writing instructors incorporate computers into their classes without the necessary scrutiny and careful planning that the use of any technology requires." The authors also express concern that computer use will continue to reinforce "those traditional notions of education that permeate our culture at its most

basic level: teachers talk, students listen; teachers' contributions are privileged; students respond in predictable, teacher-pleasing ways" (Hawisher and Selfe, 1991:55). Noting also that--as editors of Computers and Composition--they "read primarily of the laudatory influence of computers in promoting a social construction of knowledge," Hawisher and Selfe (1991:56) express concern that this enthusiastic "rhetoric . . . may also be dangerous if we want to think critically about technology and its uses" (Hawisher and Selfe, 1991:57). Though certainly "not arguing against the use of computers in general," the two authors contend that it is necessary for instructors to think "critically and carefully about [computer] technology [in order to be successful] in using it to improve the educational spaces we inhabit" (Hawisher and Selfe, 1991:64).

In conclusion, the research projects described in this chapter, while not in complete agreement, do possess one overriding characteristic: the use of the computer in the teaching of writing is a trend which will probably continue for some time to come. Indeed, Klem and Moran's assertion (1991:133) that "the computer is here to stay" is one which very few writing instructors would dispute. In addition, the shift away from the classroom situation with the teacher as the center of the student's universe to one in which the student and his or her word processor are the focal point is a

welcome one to virtually every spokesperson for and researcher of computer word processing and the teaching of written composition. The research study to be described in the following chapters is based in large part on the findings and recommendations of the writers whose works have been reviewed in the preceding pages.

Chapter 3

METHODOLOGY AND PROCEDURES

The principal methodology utilized in this study was that of quasi-experimental research. An extensive review of the literature concerning the use of computer word processing and the teaching of writing was conducted to provide a conceptual framework for the practicum. In addition, an appropriate statistical treatment was selected.

Following completion of the literature review, two English Composition II classes were randomly selected to participate in the study. One class was randomly labeled the Experimental Group and the other the Control Group. The approximate size of each group at the outset of the study was twenty students.

Students in both the Experimental Group and the Control Group were given a pretest in the form of a 50-minute in-class essay assignment the second time each class met at the beginning of the semester. Both groups used pen and paper for this pretest, and the essays were later scored holistically by two Gloucester County College English Department faculty members who have over twenty years of experience in holistic grading.

Following the pretest period, members of the Experimental Group received instruction in the use of

a computer word processing program. The initial instruction period, conducted in the college's Computer Writing Laboratory, lasted for approximately one hour. Subsequent instruction was provided on an individual basis by both the director of the lab and by student-assistants who had received training in word processing. The Experimental Group met in the lab once each week--the other class meeting being held in the regular classroom, located on the same floor of the same building. In addition to the class sessions held in the lab, students had access to the computers whenever the lab was open (approximately forty-five hours weekly). During "regular" class sessions, students met in small groups to share their drafts, brainstormed individually or in small groups, met in conferences with the instructor, revised and edited their drafts, and discussed the assignments in the large group setting.

Control Group members engaged in all of the activities mentioned above, with the exception of those associated with computer word processing. These students never visited the Computer Writing Lab as a group, and were not encouraged to do so. All in-class writing assignments were completed with pen and paper, and Control Group students were not required to type outside-of-class assignments (although some students did). It should be noted, too, that both the Control and the Experimental Group received identical writing assignments throughout the semester.

A posttest (a 50-minute in-class essay assignment) was administered to both groups at the end of twelve weeks. Students in the Experimental Group typed their posttest essays in the Computer Writing Lab, and Control Group students wrote their posttest essays in the classroom. The posttest essays of the Control Group were then typed so that examiners would not know which essays had been composed by the Experimental Group and which by the Control Group. At this point, the handwritten pretests of both groups were number-coded and combined so that scorers did not know identities of essay writers nor the affiliations of writers with regard to group. Scorers also did not know that these were pretests. Posttest essays were likewise number-coded and mixed together so that scorers did not know the identities nor group-affiliations of the writers. As mentioned, these posttest essays were typed so that readers would be unable to distinguish between work done by Control Group members and that done by Experimental Group members. Furthermore, the pretest scores of those Control Group and Experimental Group students who were not present for the posttest were discarded, as were the pretest and posttest scores of all students in both groups who were not present for at least 80 percent of the class sessions.

A "nonrandomized control-group pretest/posttest design" (Isaac and Michael, 1981:69) was employed. This quasi-experimental approach was taken because students had already been grouped into heterogeneous sections by the time the

study began; there was no possibility of truly selecting students at random from the entire Composition II population.

After the two readers holistically scored the pretests, means and standard deviations of both groups were calculated and compared for similarity. The data gathered were statistically analyzed by means of a one-tailed t-test with a confidence level of .01, in order to determine the significance of the difference between mean scores of the two groups. (No significant difference could be found in the pretest mean scores of the two groups, but a significant difference was found in the posttest mean scores of the two groups, as will be described in the "Results" chapter of this study.)

Definitions of Terms

Most terms used in this paper have been defined in the "Review of the Literature" chapter. Technical terminology has, for the most part, been avoided.

Limitations

Since neither group (Control or Experimental) was composed of volunteers, one possible threat to validity was reduced. However, other sources of contamination did exist, including interaction between selection and history, between selection and maturation, and between selection and testing. There was little probability of controlling these variables; therefore, a quasi-experimental approach was taken, with the results subjected to statistical analysis, using a one-tailed t-test with a confidence level of .05,

in order to determine whether there was a significant difference between the scores of Experimental Group students and Control Group students. In addition, unidentified or unidentifiable variables may have affected posttest scores of both groups, but this would not seem to affect one group while not affecting the other.

The smaller than anticipated number of students in both the Experimental Group and the Control Group was a source of concern (twelve and eleven, respectively). However, this decline in number from approximately twenty in each group was primarily the result of mortality and the imposition on the part of the researcher of an eighty percent attendance requirement. If the attendance requirement is seen as an attempt to include only those students who were present often enough to reap the benefits of the course learning activities and the interaction among peers and instructor in both the Control Group and the Experimental Group, then perhaps this is not a limitation, but, rather, a positive factor.

One final limitation should be noted, and that is the use of a single posttest--one which is unlike any of the in-class writing assignments given during the semester, in that regular assignments allowed students in both groups increased time for brainstorming, drafting, revising and editing their work. A fifty-minute test--permitting only enough time for brief planning and drafting--was certainly a source of concern for both students and researcher.

Assumptions

Several assumptions with regard to this study were made at the outset. First it was assumed that the two groups were representative of all Composition II students at Gloucester County College. This assumption was made because the two groups were chosen at random from a pool of three Composition II groups taught by the researcher and because there were neither "honors" nor "remedial" English Composition II classes grouped homogeneously at Gloucester County College at the time of the study. It was also assumed that the average ages of students in the two classes did not vary greatly. And finally, it was assumed that "conducting an . . . experiment without the subjects being aware of it . . ." would help to reduce the effects of certain variables, including those associated with motivation or lack of it (Isaac and Michael, 1981:70). (Students in the two classes were not told of their inclusion in the study until after the posttest.)

It should be noted that the assumption regarding the similarity of the skills of the two groups was borne out when statistical analysis of the pretest mean scores and standard deviations was completed. The obtained *t* value for the pretest was -0.855 compared with a tabled value of 1.721 (with 21 degrees of freedom), thus indicating no significant difference at the .05 confidence level (Isaac and Michael, 1981:228).

Chapter 4

RESULTS

The extensive literature review was completed and organized primarily according to type: the literature which described research projects linking computer word processing with writing instruction appeared first, followed by numerous discussions of opinions and conclusions drawn by acknowledged authorities in the field of computer usage and the teaching of writing. Virtually every work cited seemed to indicate a positive relationship between computer word processing activity and the teaching of writing. In fact, more than one writer expressed the view herein attributed to Haas (1989:204): "[T]he word processor is an important and valuable tool for writers."

As described in the preceding chapter, once the review of literature had been completed, two English Composition II classes were selected at random to participate in the study. One class was randomly identified as the Experimental Group and the other the Control Group. At this stage, the number of students in each group was approximately twenty.

A pretest, in the form of a 50-minute in-class essay assignment, was administered to both groups during the second class meeting of the semester. The essays were

later scored holistically by two members of the Gloucester County College English Department. (As mentioned previously, the scoring was carried out after posttest essays were administered, so that pretests and/or posttests of frequently absent students or dropouts could be discarded.)

The Experimental Group received training in the use of a computer word processing program, and one class period per week was spent in the Computer Writing Laboratory so that students could complete in-class writing assignments on the computers. The other class period was spent in the "regular" classroom to provide students with the opportunity of meeting in small groups to share their typed drafts or to brainstorm collectively or individually. At this time, also, students met individually with the instructor in conference. In addition, students who required more time to complete writing assignments were encouraged to work outside of class in the lab, which was open and generally available approximately forty-five hours each week.

Control Group members did not meet in the Computer Writing Lab; instead, they met in the "regular" classroom and wrote all assignments with pen and paper. Students did, however, engage in many of the activities conducted in the "regular" classroom by the other group. Since Control Group students were not required to type any of their outside assignments, it was assumed that they did not use the lab.

At the end of twelve weeks, a posttest was administered to both the Experimental and the Control Group. The test was of fifty minutes' duration, was administered to both groups on the same day during the regular class session, and was similar to--but not exactly like--the pretest. The only significant difference was the place in which the test was administered; the Control Group used pen and paper in the "regular" classroom while the Experimental Group used the computers in the lab.

A scoring range of one through six was utilized, according to Educational Testing Service recommendations, and essays were read twice (once by each reader). There were no "discrepant" scores; that is, neither reader gave any paper a score that was more than one point higher or lower than the score given by the other reader. Also, all scoring was "blind," meaning that readers did not know scores given by the other reader. In addition, scorers did not know names of students--because of the numbering system used--and did not know which essays were written by Control Group students and which by Experimental Group students. As indicated earlier, the pretest scores of Control and Experimental Group students who were not present for the posttest were discarded, as were pretest and posttest scores of all students who were not present for at least 80 percent of the class sessions.

Pretest means and standard deviations were then calculated and statistically analyzed by means of a

one-tailed t-test at a confidence level of .05. The number of scores, the mean of scores, and the standard deviation are exhibited in Table 1.

Table 1

Pretest Numbers of Scores, Means of Scores, and Standard Deviations

Group	Number of Scores	Mean of Scores	Standard Deviation
Experimental	12	6.750	0.622
Control	11	7.091	1.221

Once the above calculations were made, the data were then subjected to a one-tailed t-test at a confidence level of .05. According to a table of normal distribution values, the "significance level" for a one-tailed t-test at the .05 confidence level--with 21 degrees of freedom--is "1.721" (Isaac and Michael, 1981:228). The calculated value of *t* for the analysis of the pretest (-0.855) was less than the tabled value (1.721), thus indicating no significant difference in the pretest mean scores of the two groups.

When posttest means and standard deviations were calculated and statistically analyzed by means of a one-tailed t-test at a confidence level of .05, however, the results were quite different. Table 2, which appears at the top of page 31, shows the number of scores, the

mean of scores, and the standard deviation for the posttest.

Table 2

Posttest Numbers of Scores, Means of Scores, and Standard Deviations

Group	Number of Scores	Mean of Scores	Standard Deviation
Experimental	12	8.000	0.953
Control	11	7.182	1.328

After calculations were completed, the data were then subjected to a one-tailed t-test at a confidence level of .05. The results (3.572) were compared with the table of normal distribution values alluded to earlier (Isaac and Michael, 1981:228), which showed a tabled value of "1.721" for a one-tailed t-test at the .05 confidence level, with 21 degrees of freedom. Therefore, since the calculated *t* for the posttest (3.572) was greater than the critical value (1.721), the analysis of the data through testing permits the null hypothesis to be rejected.

Chapter 5

DISCUSSION, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Discussion

The results of the practicum were, indeed, related to the primary purpose, which was to determine if there was a positive relationship between the utilization of computer word processing techniques in the writing classroom and the improvement of the writing skills of the students involved. The random selection of Composition II classes to be included in the study, the random selection of classes to be labeled Control Group and Experimental Group, and the collection of data related to both the pretest and the posttest were all carried out in accordance with the research plan. The subjection of the data to the appropriate statistical treatment then provided the anticipated answer to the research question. It should be noted, however, that the answer to the research question--as well as any conclusions, implications and recommendations derived from that answer--must be viewed in light of the limitations and assumptions described in Chapter 3 of this document.

The review of literature was, without question, related to the primary purpose of the study in that it revealed a keen interest on the part of many researchers to examine

the many issues relative to the use of computer word processors in the English classroom. It also had value in the sense that conclusions drawn by most researchers, authorities and practitioners in the field of written composition all seem to be of one accord--that, as Klem and Moran (1991:133) put it, "the computer is here to stay."

Conclusions

The principal conclusion derived from the results was that the research hypothesis was valid. In this study, the research hypothesis was that "Gloucester County College students who undergo training and gain experience in the use of computer word processing techniques will score significantly higher on a posttest than will those students who do not receive such training and experience." This hypothesis, then, was verified, and the analysis of the data allowed the null hypothesis to be rejected, as stated earlier in this report. Thus, it was concluded that there was indeed a significant difference in the posttest mean scores of the two sample groups being tested, and the significance of the difference was established by means of the t-test.

Implications

While the study was successful in terms of rejecting the null hypothesis, verifying the research hypothesis and answering the research question, the small sample size and the fact that this was the only research study of its kind

conducted at Gloucester County College both lend support to the notion that further study is required, at this college and elsewhere. This somewhat negative implication, however, should perhaps be joined by a stronger and very positive implication--one which is borne out by the relative strength of the findings of this study--that students engaging in the writing process should be encouraged to learn the nuances of computer word processing and make use of that knowledge in all of their writing tasks. A third implication growing out of the other two is the need to inform other faculty members at Gloucester County College of the results of this study, particularly those English instructors who previously expressed a desire to replicate the study in their own classes. A final implication of the study is the need to make administrators at the college aware of the validity of the use of computer word processing techniques in the classroom.

Recommendations

Several recommendations were made as a direct result of this study. The first is a recommendation to Gloucester County College administrators that the findings of the study be distributed among all faculty members at the college, particularly the English faculty, for review and discussion. A second recommendation is to encourage faculty members who have indicated an interest in replicating the study to do so. Finally, it is recommended that a separate

classroom (apart from the Computer Writing Lab) be set aside and equipped with computer word processors. In this way, faculty members would be able to conduct classes in a room equipped with computer word processors each period of the day without being forced to utilize the lab which is frequently filled to capacity at many times of the day.

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